

**CLAIMS**

1. A flame atmosphere analyzer comprising:

- a tube in which an air-gas intake and mixing chamber is defined,
- a gas-supply nozzle and primary combustion-air supply means opening into the intake chamber,
- a flame burner comprising at least one flame jet which is in flow communication with the intake and mixing chamber in order to supply an air-gas mixture formed in the chamber to the burner, characterized in that the primary air-supply means comprise at least one duct which has a first end in flow communication with the intake chamber and which is open at the opposite, second end in order to take in the primary combustion air in a position remote and at a predetermined distance from the intake chamber in the tube.

2. An analyzer according to Claim 1 in which the duct is tubular.

3. An analyzer according to Claim 1 or Claim 2, comprising flame-detection

- means connected to a circuit for controlling the supply of gas to the nozzle in order to interrupt the gas-flow to the nozzle when the level of oxygen in the primary combustion air taken from the duct falls below a predetermined value bringing about detachment of the flame from the burner and consequent intervention of the flame-detection means.

4. An analyzer according to Claim 3 in which the flame-detection means comprise a thermocouple flame sensor.

5. An analyzer according to Claim 4 in which the burner comprises at least two flame jets which diverge from one another and the side walls of which are substantially closed to the exterior except for an optional connecting duct between the flame jets for the lighting of one by means of the other, the flame sensor being positioned relative to the jets in a manner such as to be struck by the flame of only one of them.

6. A water-heating device including a flame atmosphere analyzer according to one or more of the preceding claims and comprising:

- a main burner disposed in a combustion chamber and piloted by the analyzer, and
- means for admitting air to the combustion chamber, including partition means for the air admitted to the combustion chamber, characterized in that the duct is

extended into the combustion chamber from the tube of the analyzer so as to take in the primary combustion air in the vicinity of the main burner.

7. A device according to Claim 6 in which the partition means comprise at least one flame-arresting grid for containing the flame within the combustion chamber, the at least one grid being arranged in a portion of the combustion chamber opposite means for the discharge of the combustion fumes, and the duct for taking in primary air opening in the said portion of the combustion chamber.

8. A device according to Claim 7 in which the duct opens in the combustion chamber in the vicinity of the flame-arresting grid in order to detect any changes in the oxygen level of the primary combustion air as a result of at least partial obstruction of the flame-arresting grid.

9. A device according to one or more of Claims 6 to 8, in which the duct comprises a first portion extending from the intake chamber in the tube and a second portion forming an extension of the first portion with a predetermined inclination to the first portion and opening at the opposite, free end.

10. A device according to one or more of Claims 6 to 9, comprising a tank for the storage and heating of water for hygiene purposes.

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